SEQUENCE LISTING

<110> BORRELLI, MICHAEL J.

<120> METHODS AND COMPOSITIONS FOR HEAT ACTIVATED GENE THERAPY USING CYTOLETHAL DISTENDING TOXIN

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<210> 8
<211> 643
<212> PRT
<213> Homo sapiens

<400> 8
Met Gln Ala Pro Arg Glu Leu Ala Val Gly Ile Asp Leu Gly Thr Thr
1 5 10 15

```
Tyr Ser Cys Val Gly Val Phe Gln Gln Gly Arg Val Glu Ile Leu Ala
             20                  25                  30

Asn Asp Gln Gly Asn Arg Thr Thr Pro Ser Tyr Val Ala Phe Thr Asp
         35                  40                  45

Thr Glu Arg Leu Val Gly Asp Ala Ala Lys Ser Gln Ala Ala Leu Asn
     50                  55                  60

Pro His Asn Thr Val Phe Asp Ala Lys Arg Leu Ile Gly Arg Lys Phe
 65                  70                  75                  80

Ala Asp Thr Thr Val Gln Ser Asp Met Lys His Trp Pro Phe Arg Val
                 85                  90                  95

Val Ser Glu Gly Gly Lys Pro Lys Val Arg Val Cys Tyr Arg Gly Glu
            100                 105                 110

Asp Lys Thr Phe Tyr Pro Glu Glu Ile Ser Ser Met Val Leu Ser Lys
        115                 120                 125

Met Lys Glu Thr Ala Glu Ala Tyr Leu Gly Gln Pro Val Lys His Ala
    130                 135                 140

Val Ile Thr Val Pro Ala Tyr Phe Asn Asp Ser Gln Arg Gln Ala Thr
145                 150                 155                 160

Lys Asp Ala Gly Ala Ile Ala Gly Leu Asn Val Leu Arg Ile Ile Asn
                165                 170                 175

Glu Pro Thr Ala Ala Ala Ile Ala Tyr Gly Leu Asp Arg Arg Gly Ala
            180                 185                 190

Gly Glu Arg Asn Val Leu Ile Phe Asp Leu Gly Gly Gly Thr Phe Asp
        195                 200                 205

Val Ser Val Leu Ser Ile Asp Ala Gly Val Phe Glu Val Lys Ala Thr
    210                 215                 220

Ala Gly Asp Thr His Leu Gly Gly Glu Asp Phe Asp Asn Arg Leu Val
225                 230                 235                 240

Asn His Phe Met Glu Glu Phe Arg Arg Lys His Gly Lys Asp Leu Ser
                245                 250                 255

Gly Asn Lys Arg Ala Leu Arg Arg Leu Arg Thr Ala Cys Glu Arg Ala
            260                 265                 270

Lys Arg Thr Leu Ser Ser Ser Thr Gln Ala Thr Leu Glu Ile Asp Ser
        275                 280                 285

Leu Phe Glu Gly Val Asp Phe Tyr Thr Ser Ile Thr Arg Ala Arg Phe
    290                 295                 300

Glu Glu Leu Cys Ser Asp Leu Phe Arg Ser Thr Leu Glu Pro Val Glu
305                 310                 315                 320
```

```
Lys Ala Leu Arg Asp Ala Lys Leu Asp Lys Ala Gln Ile His Asp Val
                325                 330                 335

Val Leu Val Gly Gly Ser Thr Arg Ile Pro Lys Val Gln Lys Leu Leu
            340                 345                 350

Gln Asp Phe Phe Asn Gly Lys Glu Leu Asn Lys Ser Ile Asn Pro Asp
        355                 360                 365

Glu Ala Val Ala Tyr Gly Ala Ala Val Gln Ala Ala Val Leu Met Gly
    370                 375                 380

Asp Lys Cys Glu Lys Val Gln Asp Leu Leu Leu Leu Asp Val Ala Pro
385                 390                 395                 400

Leu Ser Leu Gly Leu Glu Thr Ala Gly Gly Val Met Thr Thr Leu Ile
                405                 410                 415

Gln Arg Asn Ala Thr Ile Pro Thr Lys Gln Thr Gln Thr Phe Thr Thr
            420                 425                 430

Tyr Ser Asp Asn Gln Pro Gly Val Phe Ile Gln Val Tyr Glu Gly Glu
        435                 440                 445

Arg Ala Met Thr Lys Asp Asn Asn Leu Leu Gly Arg Phe Glu Leu Ser
    450                 455                 460

Gly Ile Pro Pro Ala Pro Arg Gly Val Pro Gln Ile Glu Val Thr Phe
465                 470                 475                 480

Asp Ile Asp Ala Asn Gly Ile Leu Ser Val Thr Ala Thr Asp Arg Ser
                485                 490                 495

Thr Gly Lys Ala Asn Lys Ile Thr Ile Thr Asn Asp Lys Gly Arg Leu
            500                 505                 510

Ser Lys Glu Glu Val Glu Arg Met Val His Glu Ala Glu Gln Tyr Lys
        515                 520                 525

Ala Glu Asp Glu Ala Gln Arg Asp Arg Val Ala Ala Lys Asn Ser Leu
    530                 535                 540

Glu Ala His Val Phe His Val Lys Gly Ser Leu Gln Glu Glu Ser Leu
545                 550                 555                 560

Arg Asp Lys Ile Pro Glu Glu Asp Arg Arg Lys Met Gln Asp Lys Cys
                565                 570                 575

Arg Glu Val Leu Ala Trp Leu Glu His Asn Gln Leu Ala Glu Lys Glu
            580                 585                 590

Glu Tyr Glu His Gln Lys Arg Glu Leu Glu Gln Ile Cys Arg Pro Ile
        595                 600                 605

Phe Ser Arg Leu Tyr Gly Gly Pro Gly Val Pro Gly Gly Ser Ser Cys
    610                 615                 620
```

```
Gly Thr Gln Ala Arg Gln Gly Asp Pro Ser Thr Gly Pro Ile Ile Glu
625                 630                 635                 640

Glu Val Asp
```

<210> 9
<211> 968
<212> DNA
<213> Homo sapiens

<400> 9

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```

<210> 10
<211> 223
<212> PRT
<213> Haemophilus ducreyi

<400> 10

```
Met Lys Lys Phe Leu Pro Ser Leu Leu Leu Met Gly Ser Val Ala Cys
  1               5                  10                  15

Ser Ser Asn Gln Arg Met Asn Asp Tyr Ser Gln Pro Glu Ser Gln Ser
             20                  25                  30

Asp Leu Ala Pro Lys Ser Ser Thr Ile Gln Pro Gln Pro Gln Pro Leu
         35                  40                  45

Leu Ser Lys Thr Pro Ser Met Ser Leu Asn Leu Leu Ser Ser Ser Gly
     50                  55                  60

Pro Asn Arg Gln Val Leu Pro Ser Glu Pro Ser Asn Phe Met Thr Leu
 65                  70                  75                  80

Met Gly Gln Asn Gly Ala Leu Leu Thr Val Trp Ala Leu Ala Lys Arg
                 85                  90                  95

Asn Trp Leu Trp Ala Tyr Pro Asn Ile Tyr Ser Gln Asp Phe Gly Asn
            100                 105                 110
```

```
Ile Arg Asn Trp Lys Met Glu Pro Gly Lys His Arg Glu Tyr Phe Arg
        115                 120                 125

Phe Val Asn Gln Ser Leu Gly Thr Cys Val Glu Ala Tyr Gly Asn Gly
    130                 135                 140

Leu Ile His Asp Ile Cys Ser Leu Asp Lys Leu Ala Gln Glu Phe Glu
145                 150                 155                 160

Leu Leu Pro Thr Asp Ser Gly Ala Val Val Ile Lys Ser Val Ser Gln
                165                 170                 175

Gly Arg Cys Val Thr Tyr Asn Pro Val Ser Thr Thr Phe Tyr Ser Thr
            180                 185                 190

Val Thr Leu Ser Val Cys Asp Gly Ala Thr Glu Pro Ser Arg Asp Gln
        195                 200                 205

Thr Trp Tyr Leu Ala Pro Pro Val Leu Glu Ala Thr Ala Val Asn
    210                 215                 220
```

<210> 11
<211> 283
<212> PRT
<213> Haemophilus ducreyi

<400> 11

```
Met Gln Trp Val Lys Gln Leu Ser Val Val Phe Cys Val Met Leu Phe
  1               5                  10                  15

Ser Phe Ser Ser Tyr Ala Asn Leu Ser Asp Phe Lys Val Ala Thr Trp
             20                  25                  30

Asn Leu Gln Gly Ser Ser Ala Val Asn Glu Ser Lys Trp Asn Ile Asn
         35                  40                  45

Val Arg Gln Leu Leu Ser Gly Glu Gln Gly Ala Asp Ile Leu Met Val
     50                  55                  60

Gln Glu Ala Gly Ser Leu Pro Ser Ser Ala Val Arg Thr Ser Arg Val
 65                  70                  75                  80

Ile Gln His Gly Gly Thr Pro Ile Glu Glu Tyr Thr Trp Asn Leu Gly
                 85                  90                  95

Thr Arg Ser Arg Pro Asn Met Val Tyr Ile Tyr Tyr Ser Arg Leu Asp
            100                 105                 110

Val Gly Ala Asn Arg Val Asn Leu Ala Ile Val Ser Arg Arg Gln Ala
        115                 120                 125

Asp Glu Ala Phe Ile Val His Ser Asp Ser Ser Val Leu Gln Ser Arg
    130                 135                 140

Pro Ala Val Gly Ile Arg Ile Gly Thr Asp Val Phe Phe Thr Val His
145                 150                 155                 160
```

```
Ala Leu Ala Thr Gly Gly Ser Asp Ala Val Ser Leu Ile Arg Asn Ile
                165                 170                 175

Phe Thr Thr Phe Asn Ser Ser Ser Ser Pro Pro Glu Arg Arg Val Tyr
            180                 185                 190

Ser Trp Met Val Val Gly Asp Phe Asn Arg Ala Pro Ala Asn Leu Glu
        195                 200                 205

Val Ala Leu Arg Gln Glu Pro Ala Val Ser Glu Asn Thr Ile Ile Ile
    210                 215                 220

Ala Pro Thr Glu Pro Thr His Arg Ser Gly Asn Ile Leu Asp Tyr Ala
225                 230                 235                 240

Ile Leu His Asp Ala His Leu Pro Arg Arg Glu Gln Ala Arg Glu Arg
                245                 250                 255

Ile Gly Ala Ser Leu Met Leu Asn Gln Leu Arg Ser Gln Ile Thr Ser
            260                 265                 270

Asp His Phe Pro Val Ser Phe Val Arg Asp Arg
        275                 280
```

<210> 12
<211> 186
<212> PRT
<213> Haemophilus ducreyi

<400> 12

```
Met Lys Lys Tyr Leu Leu Ser Phe Leu Leu Ile Met Ile Leu Ala Leu
  1               5                  10                  15

Ala Ser His Ala Glu Ser Asn Pro Asp Pro Thr Thr Tyr Pro Asp Val
             20                  25                  30

Glu Leu Ser Pro Pro Pro Arg Ile Ser Leu Arg Ser Leu Leu Thr Ala
         35                  40                  45

Gln Pro Val Lys Asn Asp His Tyr Asp Ser His Asn Tyr Leu Ser Thr
     50                  55                  60

His Trp Glu Leu Ile Asp Tyr Lys Gly Lys Glu Tyr Glu Lys Leu Arg
 65                  70                  75                  80

Asp Gly Gly Thr Leu Val Gln Phe Lys Val Val Gly Ala Ala Lys Cys
                 85                  90                  95

Phe Ala Phe Leu Gly Lys Gly Thr Thr Asp Cys Lys Asp Thr Asp His
            100                 105                 110

Thr Val Phe Asn Leu Ile Pro Thr Asn Thr Gly Ala Phe Leu Ile Lys
        115                 120                 125

Asp Ala Leu Leu Gly Phe Cys Ile Thr Ser His Asp Phe Asp Asp Leu
    130                 135                 140
```

```
Lys Leu Glu Pro Cys Gly Gly Ser Val Ser Gly Arg Thr Phe Ser Leu
145                 150                 155                 160

Ala Tyr Gln Trp Gly Ile Leu Pro Pro Phe Gly Pro Ser Lys Ile Leu
                165                 170                 175

Ile Pro Pro Val Arg Arg Asn Gln Gly Ser
            180                 185
```

<210> 13
<211> 268
<212> PRT
<213> Campylobacter jejuni

<400> 13

```
Met Gln Lys Ile Ile Val Phe Ile Leu Cys Cys Phe Met Thr Phe Phe
  1               5                  10                  15

Leu Tyr Ala Cys Ser Ser Lys Phe Glu Asn Val Asn Pro Leu Gly Arg
             20                  25                  30

Ser Phe Gly Glu Phe Glu Asp Thr Asp Pro Leu Lys Leu Gly Leu Glu
         35                  40                  45

Pro Thr Phe Pro Thr Asn Gln Glu Ile Pro Ser Leu Ile Ser Gly Ala
     50                  55                  60

Asp Leu Val Pro Ile Thr Pro Ile Thr Pro Pro Leu Thr Arg Thr Ser
 65                  70                  75                  80

Asn Ser Ala Asn Asn Asn Ala Ala Asn Gly Ile Asn Pro Arg Phe Lys
                85                  90                  95

Asp Glu Ala Phe Asn Asp Val Leu Ile Phe Glu Asn Arg Pro Ala Val
            100                 105                 110

Ser Asp Phe Leu Thr Ile Leu Gly Pro Ser Gly Ala Ala Leu Thr Val
        115                 120                 125

Trp Ala Leu Ala Gln Gly Asn Trp Ile Trp Gly Tyr Thr Leu Ile Asp
    130                 135                 140

Ser Lys Gly Phe Gly Asp Ala Arg Val Trp Gln Leu Leu Leu Tyr Pro
145                 150                 155                 160

Asn Asp Phe Ala Met Ile Lys Asn Ala Lys Thr Asn Thr Cys Leu Asn
                165                 170                 175

Ala Tyr Gly Asn Gly Ile Val His Tyr Pro Cys Asp Ala Ser Asn His
            180                 185                 190

Ala Gln Met Trp Lys Leu Ile Pro Met Ser Asn Thr Ala Val Gln Ile
        195                 200                 205

Lys Asn Leu Gly Asn Gly Lys Cys Ile Gln Ala Pro Ile Thr Asn Leu
    210                 215                 220
```

```
Tyr Gly Asp Phe His Lys Val Phe Lys Ile Phe Thr Val Glu Cys Ala
225                 230                 235                 240

Lys Lys Asp Asn Phe Asp Gln Gln Trp Phe Leu Thr Thr Pro Pro Phe
                245                 250                 255

Thr Ala Lys Pro Leu Tyr Arg Gln Gly Glu Val Arg
            260                 265
```

<210> 14
<211> 265
<212> PRT
<213> Campylobacter jejuni

<400> 14

```
Met Lys Lys Ile Ile Cys Leu Phe Leu Ser Phe Asn Leu Ala Phe Ala
  1               5                  10                  15

Asn Leu Glu Asn Phe Asn Val Gly Thr Trp Asn Leu Gln Gly Ser Ser
            20                  25                  30

Ala Ala Thr Glu Ser Lys Trp Ser Val Ser Val Arg Gln Leu Val Ser
        35                  40                  45

Gly Ala Asn Pro Leu Asp Ile Leu Met Ile Gln Glu Ala Gly Thr Leu
    50                  55                  60

Pro Arg Thr Ala Thr Pro Thr Gly Arg His Val Gln Gln Gly Gly Thr
65                  70                  75                  80

Pro Ile Asp Glu Tyr Glu Trp Asn Leu Gly Thr Leu Ser Arg Pro Asp
                85                  90                  95

Arg Val Phe Ile Tyr Tyr Ser Arg Val Asp Val Gly Ala Asn Arg Val
            100                 105                 110

Asn Leu Ala Ile Val Ser Arg Met Gln Ala Glu Glu Val Ile Val Leu
        115                 120                 125

Pro Pro Pro Thr Thr Val Ser Arg Pro Ile Ile Gly Ile Arg Asn Gly
    130                 135                 140

Asn Asp Ala Phe Phe Asn Ile His Ala Leu Ala Asn Gly Gly Thr Asp
145                 150                 155                 160

Val Gly Ala Ile Ile Thr Ala Val Asp Ala His Phe Ala Asn Met Pro
                165                 170                 175

Gln Val Asn Trp Met Ile Ala Gly Asp Phe Asn Arg Asp Pro Ser Thr
            180                 185                 190

Ile Thr Ser Thr Val Asp Arg Glu Leu Ala Asn Arg Ile Arg Val Val
        195                 200                 205

Phe Pro Thr Ser Ala Thr Gln Ala Ser Gly Gly Thr Leu Asp Tyr Ala
    210                 215                 220
```

```
Ile Thr Gly Asn Ser Asn Arg Gln Gln Thr Tyr Thr Pro Pro Leu Leu
225                 230                 235                 240

Ala Ala Ile Leu Met Leu Ala Ser Leu Arg Ser His Ile Val Ser Asp
                245                 250                 255

His Phe Pro Val Asn Phe Arg Lys Phe
            260                 265
```

<210> 15
<211> 189
<212> PRT
<213> Campylobacter jejuni

<400> 15

```
Met Lys Lys Ile Ile Thr Leu Phe Phe Met Phe Ile Thr Leu Ala Phe
  1               5                  10                  15

Ala Thr Pro Thr Gly Asp Leu Lys Asp Phe Thr Glu Met Val Ser Ile
            20                  25                  30

Arg Ser Leu Glu Thr Gly Ile Phe Leu Ser Ala Phe Arg Asp Thr Ser
        35                  40                  45

Lys Asp Pro Ile Asp Gln Asn Trp Asn Ile Lys Glu Ile Val Leu Ser
    50                  55                  60

Asp Glu Leu Lys Gln Lys Asp Lys Leu Ala Asp Glu Leu Pro Phe Gly
65                  70                  75                  80

Tyr Val Gln Phe Thr Asn Pro Lys Glu Ser Asp Leu Cys Leu Ala Ile
                85                  90                  95

Leu Glu Asp Gly Thr Phe Gly Ala Lys Ser Cys Gln Asp Asp Leu Lys
            100                 105                 110

Asp Gly Lys Leu Glu Thr Val Phe Ser Ile Met Pro Thr Thr Thr Ser
        115                 120                 125

Ala Val Gln Ile Arg Ser Leu Val Leu Glu Ser Asp Glu Cys Ile Val
    130                 135                 140

Thr Phe Phe Asn Pro Asn Ile Pro Ile Gln Lys Arg Phe Gly Ile Ala
145                 150                 155                 160

Pro Cys Thr Leu Asp Pro Ile Phe Phe Ala Glu Val Asn Glu Leu Met
                165                 170                 175

Ile Ile Thr Pro Pro Leu Thr Ala Ala Thr Pro Leu Glu
            180                 185
```

<210> 16
<211> 33
<212> PRT
<213> Campylobacter jejuni

<400> 16
Met Leu Thr Trp Gln Gln Ile Tyr Asp Pro Phe Ser Asn Ile Trp Leu
1 5 10 15

Ser Ala Leu Val Ala Phe Leu Pro Ile Leu Cys Phe Leu Val Cys Leu
20 25 30

Val

<210> 17
<211> 237
<212> PRT
<213> Escherichia coli

<400> 17
Met Asp Lys Lys Leu Ile Ala Phe Leu Cys Thr Leu Ile Ile Thr Gly
1 5 10 15

Cys Ser Asn Gly Ile Gly Asp Ser Pro Ser Pro Pro Gly Lys Asn Val
20 25 30

Glu Leu Val Gly Ile Pro Gly Gln Gly Ile Ala Val Thr Ser Asn Gly
35 40 45

Ala Thr Pro Thr Leu Gly Ala Asn Asn Thr Glu Phe Pro Glu Val Ser
50 55 60

Ile Met Ser Thr Gly Gly Ala Leu Leu Thr Ile Trp Ala Arg Pro Val
65 70 75 80

Arg Asn Trp Leu Trp Gly Tyr Thr Pro Phe Asp Ser Val Asn Phe Gly
85 90 95

Glu Asn Arg Asn Trp Lys Val Val Asp Gly Lys Asp Ala Gly Thr Val
100 105 110

Lys Phe Val Asn Val Ala Gln Gly Thr Cys Met Glu Ala Phe Lys Asn
115 120 125

Gly Val Ile His Asn Thr Cys Asp Asp Asn Ser Leu Ser Gln Glu Phe
130 135 140

Gln Leu Leu Pro Ser Thr Asn Gly Asn Val Leu Ile Arg Ser Ser Ala
145 150 155 160

Leu Gln Thr Cys Ile Arg Ala Asp Tyr Leu Ser Arg Thr Ile Leu Ser
165 170 175

Pro Phe Ala Phe Thr Ile Thr Leu Glu Lys Cys Pro Gly Ala Lys Glu
180 185 190

Glu Thr Gln Glu Met Leu Trp Ala Ile Ser Pro Pro Val Arg Ala Ala
195 200 205

```
Lys Pro Asn Leu Ile Lys Pro Glu Leu Arg Pro Phe Arg Pro Leu Pro
    210                 215                 220

Ile Pro Pro His Asp Lys Pro Asp Gly Met Glu Gly Val
225                 230                 235
```

<210> 18
<211> 273
<212> PRT
<213> Escherichia coli

<400> 18

```
Met Lys Lys Leu Leu Phe Leu Leu Met Ile Leu Pro Gly Ile Ser Phe
  1               5                  10                  15

Ala Asp Leu Ser Asp Phe Lys Val Ala Thr Trp Asn Leu Gln Gly Ser
            20                  25                  30

Asn Ala Pro Thr Glu Asn Lys Trp Asn Thr His Val Arg Gln Leu Val
        35                  40                  45

Thr Gly Ser Gly Ala Val Asp Ile Leu Met Val Gln Glu Ala Gly Ala
    50                  55                  60

Val Pro Ala Ser Ala Thr Leu Thr Glu Arg Glu Phe Ser Thr Pro Gly
65                  70                  75                  80

Ile Pro Met Asn Glu Tyr Ile Trp Asn Thr Gly Thr Asn Ser Arg Pro
                85                  90                  95

Gln Glu Leu Phe Ile Tyr Phe Ser Arg Val Asp Ala Phe Ala Asn Arg
            100                 105                 110

Val Asn Leu Ala Ile Val Ser Asn Arg Arg Ala Asp Glu Val Ile Val
        115                 120                 125

Leu Pro Pro Pro Thr Val Val Ser Arg Pro Ile Ile Gly Ile Arg Ile
    130                 135                 140

Gly Asn Asp Val Phe Phe Ser Thr His Ala Leu Ala Asn Arg Gly Val
145                 150                 155                 160

Asp Ser Gly Ala Ile Val Asn Ser Val Phe Glu Phe Phe Asn Arg Gln
                165                 170                 175

Thr Asp Pro Ile Arg Gln Ala Ala Asn Trp Met Ile Ala Gly Asp Phe
            180                 185                 190

Asn Arg Ser Pro Ala Thr Leu Phe Ser Thr Leu Glu Pro Gly Ile Arg
        195                 200                 205

Asn His Val Asn Ile Ile Ala Pro Pro Asp Pro Thr Gln Ala Ser Gly
    210                 215                 220

Gly Val Leu Asp Tyr Ala Val Val Gly Asn Ser Val Ser Phe Val Leu
225                 230                 235                 240
```

```
Pro Leu Leu Arg Ala Ser Leu Leu Phe Gly Leu Leu Arg Gly Gln Ile
                245                 250                 255

Ala Ser Asp His Phe Pro Val Gly Phe Ile Pro Gly Arg Gly Ala Arg
            260                 265                 270

Arg
```

<210> 19
<211> 190
<212> PRT
<213> Escherichia coli

<400> 19

```
Met Lys Thr Val Ile Val Phe Phe Val Leu Leu Leu Thr Gly Cys Ala
  1               5                  10                  15

Ser Glu Pro Ala Asn Gln Arg Asn Leu Leu Thr Gln Phe Val Gly Asn
             20                  25                  30

Asn Ala Pro Val Asp Pro Glu Pro Ser Pro Val Leu Val Asn Ile Arg
         35                  40                  45

Asn Val Leu Thr Gly Gly Ile Ile Arg Asn Pro Val Gly Ser Asp Phe
     50                  55                  60

Asn Val Asn Asn Trp Val Ile Ser Glu Val Lys Thr Asn Asp Leu Asp
 65                  70                  75                  80

Leu Ile Ser Ala Pro Gly Gly His Val Gln Ile Lys Asn Pro Asp Gly
                 85                  90                  95

Asn Glu Cys Phe Ala Ile Leu Asn Gly Gln Leu Ala Val Ala Lys Gln
            100                 105                 110

Cys Ser Glu Ser Asp Arg Asn Ala Leu Phe Thr Phe Ile Thr Ser Asp
        115                 120                 125

Thr Gly Ala Val Gln Ile Lys Ser Ile Gly Ser Gly Gln Cys Leu Gly
    130                 135                 140

Asn Gly Glu Ser Ile Thr Asp Phe Arg Leu Lys Lys Cys Val Asp Asp
145                 150                 155                 160

Leu Gly Arg Pro Phe Asp Thr Val Pro Pro Gly Leu Leu Trp Met Leu
                165                 170                 175

Asn Pro Pro Leu Ser Pro Ala Ile Met Ser Pro Leu Thr Ser
            180                 185                 190
```

<210> 20
<211> 258
<212> PRT
<213> Escherichia coli

<400> 20
Met Ala Asn Lys Arg Thr Pro Ile Phe Ile Ala Gly Ile Leu Ile Pro
1 5 10 15

Ile Leu Leu Asn Gly Cys Ser Ser Gly Lys Asn Lys Ala Tyr Leu Asp
20 25 30

Pro Lys Val Phe Pro Pro Gln Val Glu Gly Gly Pro Thr Val Pro Ser
35 40 45

Pro Asp Glu Pro Gly Leu Pro Leu Pro Gly Pro Gly Pro Ala Leu Pro
50 55 60

Thr Asn Gly Ala Ile Pro Ile Pro Glu Pro Gly Thr Ala Pro Ala Val
65 70 75 80

Ser Leu Met Asn Met Asp Gly Ser Val Leu Thr Met Trp Ser Arg Gly
85 90 95

Ala Gly Ser Ser Leu Trp Ala Tyr Tyr Ile Gly Asp Ser Asn Ser Phe
100 105 110

Gly Glu Leu Arg Asn Trp Gln Ile Met Pro Gly Thr Arg Pro Asn Thr
115 120 125

Ile Gln Phe Arg Asn Val Asp Val Gly Thr Cys Met Thr Ser Phe Pro
130 135 140

Gly Phe Lys Gly Gly Val Gln Leu Ser Thr Ala Pro Cys Lys Phe Gly
145 150 155 160

Pro Glu Arg Phe Asp Phe Gln Pro Met Ala Thr Arg Asn Gly Asn Tyr
165 170 175

Gln Leu Lys Ser Leu Ser Thr Gly Leu Cys Ile Arg Ala Asn Phe Leu
180 185 190

Gly Arg Thr Pro Ser Ser Pro Tyr Ala Thr Thr Leu Thr Met Glu Arg
195 200 205

Cys Pro Ser Ser Gly Glu Lys Asn Phe Glu Phe Met Trp Ser Ile Ser
210 215 220

Glu Pro Leu Arg Pro Ala Leu Ala Thr Ile Ala Lys Pro Glu Ile Arg
225 230 235 240

Pro Phe Pro Pro Gln Pro Ile Glu Pro Asp Glu His Ser Thr Gly Gly
245 250 255

Glu Gln

<210> 21
<211> 269
<212> PRT
<213> Escherichia coli

<400> 21
Met Lys Lys Tyr Ile Ile Ser Leu Ile Val Phe Leu Ser Phe Tyr Ala
1 5 10 15

Gln Ala Asp Leu Thr Asp Phe Arg Val Ala Thr Trp Asn Leu Gln Gly
20 25 30

Ala Ser Ala Thr Thr Glu Ser Lys Trp Asn Ile Asn Val Arg Gln Leu
35 40 45

Ile Ser Gly Glu Asn Ala Val Asp Ile Leu Ala Val Gln Glu Ala Gly
50 55 60

Ser Pro Pro Ser Thr Ala Val Asp Thr Gly Thr Leu Ile Pro Ser Pro
65 70 75 80

Gly Ile Pro Val Arg Glu Leu Ile Trp Asn Leu Ser Thr Asn Ser Arg
85 90 95

Pro Gln Gln Val Tyr Ile Tyr Phe Ser Ala Val Asp Ala Leu Gly Gly
100 105 110

Arg Val Asn Leu Ala Leu Val Ser Asn Arg Arg Ala Asp Glu Val Phe
115 120 125

Val Leu Ser Pro Val Arg Gln Gly Gly Arg Pro Leu Leu Gly Ile Arg
130 135 140

Ile Gly Asn Asp Ala Phe Phe Thr Ala His Ala Ile Ala Met Arg Asn
145 150 155 160

Asn Asp Ala Pro Ala Leu Val Glu Glu Val Tyr Asn Phe Phe Arg Asp
165 170 175

Ser Arg Asp Pro Val His Gln Ala Leu Asn Trp Met Ile Leu Gly Asp
180 185 190

Phe Asn Arg Glu Pro Ala Asp Leu Glu Met Asn Leu Thr Val Pro Val
195 200 205

Arg Arg Ala Ser Glu Ile Ile Ser Pro Ala Ala Ala Thr Gln Thr Ser
210 215 220

Gln Arg Thr Leu Asp Tyr Ala Val Ala Gly Asn Ser Val Ala Phe Arg
225 230 235 240

Pro Ser Pro Leu Gln Ala Gly Ile Val Tyr Gly Ala Arg Arg Thr Gln
245 250 255

Ile Ser Ser Asp His Phe Pro Val Gly Val Ser Arg Arg
260 265

<210> 22
<211> 181
<212> PRT
<213> Escherichia coli

<400> 22
Met Lys Lys Leu Ala Ile Val Phe Thr Met Leu Leu Ile Ala Gly Cys
1 5 10 15

Ser Ser Ser Gln Asp Ser Ala Asn Asn Gln Ile Asp Glu Leu Gly Lys
20 25 30

Glu Asn Asn Ser Leu Phe Thr Phe Arg Asn Ile Gln Ser Gly Leu Met
35 40 45

Ile His Asn Gly Leu His Gln His Gly Arg Glu Thr Ile Gly Trp Glu
50 55 60

Ile Val Pro Val Lys Thr Pro Glu Glu Ala Leu Val Thr Asp Gln Ser
65 70 75 80

Gly Trp Ile Met Ile Arg Thr Pro Asn Thr Asp Gln Cys Leu Gly Thr
85 90 95

Pro Asp Gly Arg Asn Leu Leu Lys Met Thr Cys Asn Ser Thr Ala Lys
100 105 110

Lys Thr Leu Phe Ser Leu Ile Pro Ser Thr Thr Gly Ala Val Gln Ile
115 120 125

Lys Ser Val Leu Ser Gly Leu Cys Phe Leu Asp Ser Lys Asn Ser Gly
130 135 140

Leu Ser Phe Glu Thr Gly Lys Cys Ile Ala Asp Phe Lys Lys Pro Phe
145 150 155 160

Glu Val Val Pro Gln Ser His Leu Trp Met Leu Asn Pro Leu Asn Thr
165 170 175

Glu Ser Pro Ile Ile
180

<210> 23
<211> 155
<212> PRT
<213> Escherichia coli

<400> 23
Glu Asn Lys Trp Asn Thr His Val Arg Gln Leu Val Thr Gly Ser Gly
1 5 10 15

Ala Val Asp Ile Leu Met Val Gln Glu Ala Gly Ala Val Pro Ala Ser
20 25 30

Ala Thr Leu Thr Glu Arg Glu Phe Ser Thr Pro Gly Ile Pro Met Asn
35 40 45

Glu Tyr Ile Trp Asn Thr Gly Thr Asn Ser Arg Pro Gln Glu Leu Phe
50 55 60

Ile Tyr Phe Ser Arg Val Asp Ala Phe Ala Asn Arg Val Asn Leu Ala
65 70 75 80

```
Ile Val Ser Asn Arg Arg Ala Asp Glu Val Ile Val Leu Pro Pro Pro
                  85                  90                  95

Thr Val Val Ser Arg Pro Ile Ile Gly Ile Arg Ile Gly Asn Asp Val
            100                 105                 110

Phe Phe Ser Thr His Ala Leu Ala Asn Arg Gly Val Asp Ser Gly Ala
        115                 120                 125

Ile Val Asn Ser Val Phe Glu Phe Phe Asn Arg Gln Thr Asp Pro Ile
    130                 135                 140

Arg Gln Ala Ala Asn Trp Met Ile Ala Gly Asp
145                 150                 155
```

<210> 24
<211> 609
<212> PRT
<213> Homo sapiens

<400> 24

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Met Ser Gly Trp Glu Ser Tyr Tyr Lys Thr Glu Gly Asp Glu Glu Ala
  1               5                  10                  15

Glu Glu Glu Gln Glu Glu Asn Leu Glu Ala Ser Gly Asp Tyr Lys Tyr
             20                  25                  30

Ser Gly Arg Asp Ser Leu Ile Phe Leu Val Asp Ala Ser Lys Ala Met
         35                  40                  45

Phe Glu Ser Gln Ser Glu Asp Glu Leu Thr Pro Phe Asp Met Ser Ile
     50                  55                  60

Gln Cys Ile Gln Ser Val Tyr Ile Ser Lys Ile Ile Ser Ser Asp Arg
 65                  70                  75                  80

Asp Leu Leu Ala Val Val Phe Tyr Gly Thr Glu Lys Asp Lys Asn Ser
                 85                  90                  95

Val Asn Phe Lys Asn Ile Tyr Val Leu Gln Glu Leu Asp Asn Pro Gly
            100                 105                 110

Ala Lys Arg Ile Leu Glu Leu Asp Gln Phe Lys Gly Gln Gln Gly Gln
        115                 120                 125

Lys Arg Phe Gln Asp Met Met Gly His Gly Ser Asp Tyr Ser Leu Ser
    130                 135                 140

Glu Val Leu Trp Val Cys Ala Asn Leu Phe Ser Asp Val Gln Phe Lys
145                 150                 155                 160

Met Ser His Lys Arg Ile Met Leu Phe Thr Asn Glu Asp Asn Pro His
                165                 170                 175

Gly Asn Asp Ser Ala Lys Ala Ser Arg Ala Arg Thr Lys Ala Gly Asp
            180                 185                 190
```

```
Leu Arg Asp Thr Gly Ile Phe Leu Asp Leu Met His Leu Lys Lys Pro
        195                 200                 205

Gly Gly Phe Asp Ile Ser Leu Phe Tyr Arg Asp Ile Ile Ser Ile Ala
    210                 215                 220

Glu Asp Glu Asp Leu Arg Val His Phe Glu Glu Ser Ser Lys Leu Glu
225                 230                 235                 240

Asp Leu Leu Arg Lys Val Arg Ala Lys Glu Thr Arg Lys Arg Ala Leu
                245                 250                 255

Ser Arg Leu Lys Leu Lys Leu Asn Lys Asp Ile Val Ile Ser Val Gly
            260                 265                 270

Ile Tyr Asn Leu Val Gln Lys Ala Leu Lys Pro Pro Pro Ile Lys Leu
        275                 280                 285

Tyr Arg Glu Thr Asn Glu Pro Val Lys Thr Lys Thr Arg Thr Phe Asn
    290                 295                 300

Thr Ser Thr Gly Gly Leu Leu Leu Pro Ser Asp Thr Lys Arg Ser Gln
305                 310                 315                 320

Ile Tyr Gly Ser Arg Gln Ile Ile Leu Glu Lys Glu Glu Thr Glu Glu
                325                 330                 335

Leu Lys Arg Phe Asp Asp Pro Gly Leu Met Leu Met Gly Phe Lys Pro
            340                 345                 350

Leu Val Leu Leu Lys Lys His His Tyr Leu Arg Pro Ser Leu Phe Val
        355                 360                 365

Tyr Pro Glu Glu Ser Leu Val Ile Gly Ser Ser Thr Leu Phe Ser Ala
    370                 375                 380

Leu Leu Ile Lys Cys Leu Glu Lys Glu Val Ala Ala Leu Cys Arg Tyr
385                 390                 395                 400

Thr Pro Arg Arg Asn Ile Pro Pro Tyr Phe Val Ala Leu Val Pro Gln
                405                 410                 415

Glu Glu Glu Leu Asp Asp Gln Lys Ile Gln Val Thr Pro Pro Gly Phe
            420                 425                 430

Gln Leu Val Phe Leu Pro Phe Ala Asp Asp Lys Arg Lys Met Pro Phe
        435                 440                 445

Thr Glu Lys Ile Met Ala Thr Pro Glu Gln Val Gly Lys Met Lys Ala
    450                 455                 460

Ile Val Glu Lys Leu Arg Phe Thr Tyr Arg Ser Asp Ser Phe Glu Asn
465                 470                 475                 480

Pro Val Leu Gln Gln His Phe Arg Asn Leu Glu Ala Leu Ala Leu Asp
                485                 490                 495
```

```
Leu Met Glu Pro Glu Gln Ala Val Asp Leu Thr Leu Pro Lys Val Glu
            500                 505                 510

Ala Met Asn Lys Arg Leu Gly Ser Leu Val Asp Glu Phe Lys Glu Leu
        515                 520                 525

Val Tyr Pro Pro Asp Tyr Asn Pro Glu Gly Lys Val Thr Lys Arg Lys
    530                 535                 540

His Asp Asn Glu Gly Ser Gly Ser Lys Arg Pro Lys Val Glu Tyr Ser
545                 550                 555                 560

Glu Glu Glu Leu Lys Thr His Ile Ser Lys Gly Thr Leu Gly Lys Phe
                565                 570                 575

Thr Val Pro Met Leu Lys Glu Ala Cys Arg Ala Tyr Gly Leu Lys Ser
            580                 585                 590

Gly Leu Lys Lys Gln Glu Leu Leu Glu Ala Leu Thr Lys His Phe Gln
        595                 600                 605

Asp
```

<210> 25
<211> 247
<212> PRT
<213> Homo sapiens

<400> 25

```
Met Gln Ala Pro Arg Glu Leu Ala Val Gly Ile Asp Leu Gly Thr Thr
  1               5                  10                  15

Tyr Ser Cys Val Gly Val Phe Gln Gln Gly Arg Val Glu Ile Leu Ala
             20                  25                  30

Asn Asp Gln Gly Asn Arg Thr Thr Pro Ser Tyr Val Ala Phe Thr Asp
         35                  40                  45

Thr Glu Arg Leu Val Gly Asp Ala Ala Lys Asn Gln Ala Ala Leu Asn
     50                  55                  60

Pro His Asn Thr Val Phe Asp Ala Lys Arg Leu Ile Gly Arg Lys Phe
 65                  70                  75                  80

Ala Asp Thr Thr Val Gln Ser Asp Met Lys His Trp Pro Phe Lys Val
                85                  90                  95

Val Ser Gly Gly Gly Lys Pro Lys Val Arg Val Cys Tyr Arg Gly Glu
            100                 105                 110

Asp Lys Thr Phe Tyr Pro Glu Glu Ile Ser Ser Met Val Leu Thr Lys
        115                 120                 125

Met Lys Glu Thr Ala Glu Ala Tyr Leu Gly Gln Pro Val Lys His Ala
    130                 135                 140
```

```
Val Ile Thr Val Pro Thr Tyr Phe Ser Asn Ser Gln Arg Gln Ala Thr
145                 150                 155                 160

Lys Asp Ala Gly Ala Ile Ala Gly Leu Lys Val Leu Pro Ile Ile Asn
                165                 170                 175

Glu Ala Thr Ala Ala Ala Ile Ala Tyr Gly Leu Asp Arg Arg Arg Ala
            180                 185                 190

Gly Lys Arg Asn Val Leu Ile Phe Asp Leu Gly Gly Gly Thr Phe Asp
        195                 200                 205

Val Ser Val Leu Thr Ile Asp Ala Gly Val Phe Glu Val Lys Ala Thr
    210                 215                 220

Ala Gly Asp Thr His Leu Gly Gly Glu Asp Phe Asp Asn Arg Leu Val
225                 230                 235                 240

Asn His Phe Met Glu Glu Phe
                245
```